

great hindrance to navigation, but during the last few days of the month there was some improvement, most of this ice softening or breaking up.

Numerous steamships were damaged by ramming their way through ice, and a few were caught in heavy ice floes and carried aground.

OCEAN GALES AND STORMS, FEBRUARY 1936

Vessel	Voyage		Position at time of lowest barometer		Gale began February—	Time of lowest barometer February—	Gale ended February—	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Exporter, Am. S. S.	Casablanca	New York	35 49 N.	62 08 W.	1	Noon, 1.	3	29.84	W	W, 7	WNW	WNW, 10	W-WNW.
Steel Inventor, Am. S. S.	Swansea	Baltimore	47 18 N.	45 36 W.	4	9a, 3.	5	29.37	W	W, 6	S	NW, 11	
Chickasaw City, Am. S. S.	Cristobal	Boston	12 00 N.	78 02 W.	3	4p, 3.	4	29.75	NE	NE, 7	E	E, 8	
Exporter, Am. S. S.	Casablanca	New York	37 40 N.	70 14 W.	4	11p, 4.	5	29.68	S	SW, 9	N	SW, 10	SW-Var-NW.
Jean Jadot, Belg. S. S.	New York	Antwerp	45 08 N.	41 49 W.	4	Mdt., 4.	5	29.25	WNW	W, 10	NNW	WNW, 10	W-WNW.
Cardonia, Am. S. S.	Rotterdam	New Orleans	32 15 N.	30 45 W.	5	2p, 5.	5	29.61	NW	NW, 10	N	NW, 10	NW-N.
American Importer, Am. S. S.	Liverpool	New York	47 15 N.	42 07 W.	6	4a, 6.	7	29.04	W	SW, 7	NW	NW, 10	SSW-W.
F. Q. Barstow, Am. S. S.	Baytown, Tex.	Providence	35 16 N.	74 45 W.	6	10a, 7.	7	29.32	NE	E, 6	NNE	NW, 12	E-WNW-NW.
Borinquen, Am. S. S.	New York	San Juan	36 00 N.	71 40 W.	7	4p, 7.	7	29.30	NE	SW, 7	NNW	NNW, 10	S-SW-NNW.
Collamer, Am. S. S.	Havre	New York	37 15 N.	42 00 W.	8	1a, 9.	10	28.22	WSW	W, 11	NW	W, 12	W-NNW.
Maiden Creek, Am. S. S.	Glasgow	Mobile	35 20 N.	42 25 W.	8	do.	9	28.96	WSW	W, 11	NNW	W, 11	WSW-W.
Louisiana, Fr. S. S.	Antwerp	do	35 10 N.	39 00 W.	8	3a, 9.	10	29.13	WSW	WSW, 10	NNW	WNW, 11	WSW-NW.
West Tacook, Am. S. S.	London	Galveston	32 25 N.	36 35 W.	8	4a, 9.	10	29.46	WSW	WSW, 8	NW	NW, 9	WSW-W.
Imlay, Am. S. S.	New York	Corpus Christi	27 26 N.	94 41 W.	8	6a, 9.	9	29.89	NW	NW, 9	N	NW, 9	WNW-NW.
American Shipper, Am. S. S.	do.	Liverpool	50 20 N.	19 17 W.	8	2p, 9.	9	28.86	E	ESE, 9	SSE	ESE, 10	
Shickshinny, Am. S. S.	Antwerp	Wilmington, N. C.	41 17 N.	32 50 W.	6	do.	11	28.57	WSW	NNE, 10	SW	NW, 11	NE-NNE.
Helmstrath, Br. S. S.	Huelva	Philadelphia	36 16 N.	20 08 W.	9	4a, 10.	10	29.29	SW	SW, 8	WSW	SW, 9	SW-WSW.
San Antonio, Fr. S. S.	Havre	Cristobal	43 00 N.	16 00 W.	10	Noon, 10.	10	28.73	SSW	SW, 10	WSW	SW, 10	SW-WSW.
Boston City, Br. S. S.	Halifax	Cardiff	51 21 N.	18 07 W.	8	7p, 10.	10	28.55	E	E, 8	S	E, 10	E-S.
Shickshinny, Am. S. S.	Antwerp	Wilmington, N. C.	38 00 N.	41 50 W.	12	4a, 12.	14	29.65	SW	SW, 8	NW	NW, 12	None.
Losada, Br. M. S.	Magallanes	London	24 32 N.	17 00 W.	11	5a, 12.	13	29.66	W	W, 8	WNW	W, 9	W-WNW.
Pawnee, Am. S. S.	Tampa	New Orleans	28 39 N.	87 38 W.	13	6a, 13.	13	29.34	S	W, 10	W	W, 10	S-W-NNW.
El Estero, Am. S. S.	Norfolk	Houston	30 00 N.	77 24 W.	13	6p, 13.	13	29.62	S	SSW, 8	SW	S, 10	S-SW.
Forbes Hauptman, Am. S. S.	do.	Colon	29 48 N.	74 23 W.	13	11p, 13.	14	29.73	E	SSW, 11	SSW	SSW, 11	SSE-SW.
Standard, Am. S. S.	New York	Aruba	37 38 N.	73 10 W.	14	8a, 14.	14	29.30	SE	SSW, 8	NNW	W, 10	S-W.
Yaka, Am. S. S.	Manchester	Tampa	40 29 N.	31 02 W.	14	2p, 14.	16	28.65	WSW	WNW, 12	WSW	WNW, 12	WSW-WNW
Japan Arrow, Am. S. S.	Boston	Beaumont	37 37 N.	70 45 W.	13	do.	15	29.23	SE	WSW, 8	NW	SE, 10	SSW-W.
Helmstrath, Br. S. S.	Huelva	Philadelphia	34 45 N.	34 06 W.	14	4p, 14.	15	29.67	W	WNW, 10	WNW	WNW, 10	WNW-NW.
Syros, Am. S. S.	Rotterdam	Galveston	37 50 N.	26 30 W.	14	2a, 15.	16	29.20	S	W, 10	W	W, 10	None.
Afoundria, Am. S. S.	do.	Tampa	42 30 N.	25 15 W.	14	9a, 15.	16	28.67	SW	WSW, 7	W	WNW, 10	WSW-WNW.
West Harshaw, Am. S. S.	Manchester	New Orleans	38 19 N.	37 16 W.	16	8a, 16.	16	29.14	SW	SW, 9	NNW	WSW, 10	SW-NNW.
Mahanada, Br. S. S.	Gibraltar	Boston	36 10 N.	27 40 W.	16	2a, 17.	17	29.09	SW	W, 7	WNW	WSW, 10	WSW-NW.
Losada, Br. M. S.	Magallanes	London	43 16 N.	9 37 W.	15	5p, 17.	18	29.02	WSW	SSE, 8	SSW	SSE, 9	SSE-SSW.
Quaker City, Am. S. S.	New York	Cork	42 00 N.	60 35 W.	18	Mdt., 18.	19	29.45	SSW	SSW, 10	W	SW, 10	W-SW.
Otho, Am. S. S.	Freetown	Philadelphia	32 55 N.	62 36 W.	23	6p, 22.	24	29.74	WNW	SSW, 7	NW	NW, 9	SSW-WNW.
Standard, Am. S. S.	Aruba	New York	12 54 N.	70 24 W.	24	7p, 22.	25	29.97	NNE	E, 4	ENE	NE, 8	
Greystoke Castle, Br. M. S.	Penang via Cape of Good Hope	do.	26 23 N.	63 41 W.	22	10p, 22.	24	29.92	SW	NW, 8	N	NW, 8	SW-NW-N.
Breedyk, Du. S. S.	Rotterdam	Tampa	32 56 N.	51 48 W.	23	3p, 23.	24	29.79	S	SSW, 8	NNW	WNW, 8	SSW-NNW.
Neptunia, Ital. M. S.	Recife	Gibraltar	9 00 N.	25 35 W.	26	10a, 25.	28	29.80	NE	NE, 5	NE	NE, 8	None.
Salawati, Du. M. S.	Capetown	Boston	25 40 N.	46 06 W.	27	4p, 27.	28	29.86	NNW	NNW, 10	NNE	NNW, 10	NNW-N.
Narbo, Am. S. S.	Greenock	Port Neches	51 20 N.	7 49 W.	28	Mdt., 27.	*1	29.20	NNW	NW, 6	N	N, 10	W-NW.
Mexique, Fr. S. S.	New Orleans	Vera Cruz	20 00 N.	95 37 W.	28	do.	28	29.98	W	W, 7	NNW	NW, 7	W-NW.
NORTH PACIFIC OCEAN													
Ogura Maru, Jap. M. S.	Yokohama	Los Angeles	36 18 N.	149 30 E.	1	10a, 2.	2	29.26	NW	W, 7	WNW	NW, 8	WNW-W.
Diamond Head, Am. S. S.	Portland, Oreg.	Port Allen, T. H.	28 08 N.	153 03 W.	*31	6p, 2.	2	29.13	E	SE, 4	S	SE, 10	SE-S.
Tai Ping, Yang, Pan. M.S.	Yokohama	San Francisco	41 42 N.	162 00 E.	1	10a, 3.	1	29.13	WNW	WSW, 5	WNW	WNW, 9	
Tatsuno Maru, Jap. S.S.	do.	Los Angeles	39 42 N.	157 17 E.	*31	4a, 3.	4	29.11	NW	WNW, 6	W	WNW, 10	NW-W.
Chinese Prince, Br. M.S.	Los Angeles	Kobe	29 56 N.	161 06 E.	2	Mdt., 2.	3	29.70	WSW	WSW, 10	NNW	WSW, 10	WSW-WNW.
Peter Maersk, Dan. M.S.	do.	Yokohama	34 18 N.	152 00 W.	3	9p, 4.	4	29.57	E	E, 7	SE	E, 8	E-SE.
Biyo Maru, Jap. S. S.	Mike	Seattle	31 28 N.	131 51 E.	4	5a, 4.	5	29.89	S	W, 12	NNW	NNW, 9	W-WNW.
Corneville, Nor. M. S.	San Francisco	Yokohama	32 N.	150 E.	4	2p, 5.	6	29.13	SSW	W, 12	NNW	W, 12	None.
Chinese Prince, Br. M.S.	Los Angeles	Kobe	30 37 N.	150 10 E.	5	6a, 5.	6	29.40	SSW	SSW, 9	NW	W, 12	SSW-W.
Pres. Hoover, Am. S. S.	Honolulu	Yokohama	29 49 N.	153 10 E.	5	2p, 5.	6	29.46	SSW	W, 9	NW	WNW, 11	S-W.
Peter Maersk, Dan. M. S.	Los Angeles	do.	34 38 N.	160 52 W.	6	6a, 6.	7	29.37	WNW	NW, 7	NW	NW, 9	Steady.
Athelprincess, Br. M.S.	Nagasaki	Esteros Bay	34 44 N.	167 51 E.	6	Noon, 6.	6	29.38	SSE	SW, 9	W	S, 10	S-SW.
Pres. Polk, Am. S. S.	San Francisco	Honolulu	23 54 N.	153 30 W.	6	2p, 6.	7	29.51	SW	W, 8	WNW	WNW, 8	None.
Paul Shoup, Am. S. S.	do.	do.	25 00 N.	150 20 W.	6	2a, 7.	8	29.53	W	W, 8	W	W, 8	S-W.
Manoa, Am. S. S.	do.	do.	31 14 N.	140 11 W.	10	2a, 9.	10	29.43	WSW	S, 5	WSW	W, 8	S-W.
Empress of Japan, Br. S. S.	Victoria	do.	38 27 N.	141 02 W.	10	4p, 10.	11	29.14	W	SE, 2	WNW	WNW, 8	SE-W.
Spirilla, Br. S. S.	Los Angeles	Kobe	31 01 N.	148 20 E.	11	7p, 11.	12	29.72	W	W, 6	NW	W, 10	None.
Peter Maersk, Dan. M. S.	do.	Yokohama	34 49 N.	168 45 E.	12	4p, 12.	13	29.36	S	SSW, 7	WNW	W, 10	SSW-SW.
Koyo Maru, Jap. S. S.	Yokohama	Port San Luis	38 21 N.	175 15 W.	13	2a, 13.	13	29.05	WSW	WSW, 7	W	W, 10	WSW-W.
Peter Maersk, Dan. M. S.	Los Angeles	Yokohama	34 37 N.	156 33 E.	15	Noon, 15.	16	29.54	S	SSW, 7	NNW	NW, 11	SSW-W.
Pres. Jefferson, Am. S. S.	Seattle	do.	49 52 N.	173 30 E.	20	8p, 22.	22	29.05	SE	S, 6	S	SE, 9	SSE-SSW.
Koyo Maru, Jap. S. S.	Yokohama	Port San Luis	38 08 N.	136 21 W.	20	10p, 20.	21	29.06	SW	SW, 7	WSW	W, 8	SW-W.
Illinois, Am. S. S.	Manila	San Francisco	47 18 N.	163 36 W.	23	1p, 24.	24	29.41	ESE	SW, 6	SE	ESE, 9	S-SW-W.
Golden Mountain, Am. S. S.	Tandoc	do.	31 57 N.	147 19 E.	23	5a, 24.	24	29.02	S	WNW, 12	N	WNW, 12	W-NW.
Pennsylvania, Am. S. S.	Manila	do.	33 06 N.	148 06 E.	23	3a, 24.	24	28.76	SW	SW, 11	NNW	W, 12	SW-WNW.
Shelton, Am. S. S.	Tabaco	Los Angeles	31 30 N.	149 10 E.	24	4a, 24.	24	29.35	SW	SW, 8	NW	WNW, 11	SW-WNW.
Skrumstad, Nor. M. S.	Manila	do.	28 42 N.	158 50 E.	24	10a, 24.	25	29.42	SSE	SSW, 8	NW	W, 9	S-SW-W.
Meigs, U. S. A. T.	do.	San Francisco	36 50 N.	170 32 E.	24	6a, 25.	26	28.43	SE	ESE, 5	W	WNW, 11	ESE-WSW.
Golden Hind, Am. S. S.	Otaru	do.	41 38 N.	169 18 W.	24	4a, 26.	27	28.54	SSE	SE, 8	WSW	SW, 10	SE-SW.

* Position approximate.

* Barometer uncorrected.

* March.

* January.

OCEAN GALES AND STORMS, FEBRUARY 1936—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began February—	Time of lowest barometer February—	Gale ended February—	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Continued													
Shelton, Am. S. S.	Tabaco	Los Angeles	33 30 N.	153 42 E.	25	5p, 25	26	<i>Inches</i> 29.62	W	W, 8	NW	NW, 9	WSW-W.
Golden Mountain, Am. S. S.	Tandoc	San Francisco	33 12 N.	152 41 E.	25	4p, 25	26	29.62	SW	NW, 7	N	NW, 9	None.
Empress of Asia, Br. S. S.	Victoria	Yokohama	52 06 N.	167 35 W.	26	4p, 26	27	28.98	ENE	ENE, 7	N	NE, 8	ENE-NE.
Shelton, Am. S. S.	Tabaco	Los Angeles	33 38 N.	159 40 E.	27	4p, 27	28	28.58	SE	SW, 12	NW	WSW, 12	SW-NW.
Golden Mountain, Am. S. S.	Tandoc	San Francisco	34 44 N.	160 36 E.	27	6p, 27	28	28.64	S	S, 10	NW	NW, 12	SE-S-NW.
Pennsylvania, Am. S. S.	Manila	do	36 36 N.	162 24 E.	27	do	28	29.27	ENE	ENE	N	NNE, 9	ENE-NNE.
Meigs, U. S. A. T.	do	do	36 52 N.	166 43 W.	27	Noon, 28	28	29.10	SSE	SSW, 8	WSW	SSW, 10	SSE-SSW.
SOUTH PACIFIC OCEAN													
Maunganui, Br. S. S.	Rarotonga	Wellington, N. Z.	40 24 S.	177 05 E.	2	4p, 2	3	28.73	N	WSW, 2	S	SSW, 12	N-WSW-SSW.

NORTH PACIFIC OCEAN, FEBRUARY 1936

BY WILLIS E. HURD

Atmospheric pressure.—The major average-pressure feature over the North Pacific Ocean in February 1936 was a great depression which dominated all the northern part of the ocean except extreme northeastern waters, and in middle longitudes extended well into the equatorial region. The lowest average pressure recorded for the month was 29.58 inches, at Dutch Harbor. This was practically normal for February. The center of the low, however, was somewhat to the southwestward. The extent of the depression is well indicated by the fact that at Midway Island and Honolulu the average barometers were 0.13 and 0.15 inch, respectively, below the normal for the month. At Honolulu the barometer fell to 29.34 inches on the 3d, which is, by almost two-tenths of an inch, the record low pressure for that station.

In extreme eastern waters of the Pacific, abnormal pressure conditions prevailed from the Alaskan Peninsula southeastward to southern California, as shown by the averages at Kokiak and Juneau, which were much above normal, and at Tatoosh Island and San Francisco, which were considerably below.

Over the southeastern and southwestern parts of the ocean, pressures were practically normal.

The high-pressure systems, on the average, this month were confined to the extreme northeastern Pacific and to the waters east of China.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, February 1936, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	30.54	+0.42	31.10	4	30.02	29
Dutch Harbor	29.58	— .02	30.28	1	28.90	15
St. Paul	29.68	+ .03	30.32	1	29.04	15
Kodiak	29.85	+ .23	30.38	1	28.76	29
Juneau	30.06	+ .14	30.46	6	29.21	29
Tatoosh Island	29.88	— .12	30.47	29	29.10	21
San Francisco	29.98	— .12	30.45	26	29.53	12
Mazatlan	29.93	— .00	30.04	9	29.84	3, 4
Honolulu	29.90	— .15	30.08	11	29.34	3
Midway Island	29.86	— .13	30.10	9, 10	29.52	22
Guam	29.92	+ .01	30.02	12	29.84	21
Manila	29.89	— .00	29.96	(1)	29.80	28
Hong Kong	29.97	— .08	30.28	11	29.67	25
Naha	30.01	— .04	30.26	12	29.68	25
Chichishima	29.96	— .02	30.18	3	29.76	20
Nemuro	29.86	— .08	30.24	7	29.44	18

1 On seven dates.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—The meteorological conditions observed over the North Pacific were of unusual interest. In higher latitudes, although the Aleutian disturbance was prevalent throughout March, the degree of storminess between 40° N. and the Aleutian Islands and Alaska was comparatively slight. Practically all the gales reported along the northern routes occurred between the meridians of 180° and 160° W. on the 24th to 27th, and were mostly of forces 8 to 9.

The region most affected by storminess was that of the middle latitudes, roughly between 25° and 40° N. Into the western part of this region moved the most intense cyclones of the month; the central part was invaded to unusually low latitudes by extensions of the fluctuating Aleutian cyclone; and the eastern area was the scene of the abnormal cyclonic activity which on the 3d caused the lowest pressure ever known over the eastern Hawaiian Islands.

This storm, which may be referred to as the Hawaiian cyclone, was centered to the northeast of the islands on the 1st, moving west, with a southward inclination. It was already of great depth for its location, and by the 2d had acquired considerable wind intensity, as indicated by the report of the American steamer *Diamond Head*, which experienced a gale of force 10 from the southeast. The ship's lowest barometer for the day was 29.13 inches, read near 28° N., 153° W. On the 3d the center was close to the north of Honolulu. Thereafter the storm moved first to the northeast and then to the northwest but from the 7th to 10th remained practically stationary about midway along the California to Hawaii routes. On the 11th it moved rapidly northeast and entered the Washington-Oregon coast on the 12th. Throughout its course it was of unusual depth for a cyclone in this region. Fresh local gales attended most of its course from the 1st to 12th, except on the 2d, when the heavier gale was reported.

An important cyclone of the month was that which lay as a depression over central Japan on February 3. This disturbance moved rapidly seaward, and had gathered great energy by the 4th, on which date the American steamer *President Garfield*, near 35° N., 145° E., experienced a south-southwest gale of hurricane force, barometer 29.30. On the 5th the Norwegian motorship *Corneville* and the British motorship *Chinese Prince* were heavily involved near 30°–32° N., 150° E., both reporting hurricane velocities. In a special report of the storm from the *Chinese Prince*, Capt. W. Finch, master, Leslie G. Taylor, third officer and observer, the violence of the storm was stressed, and it was stated that on the morning of the